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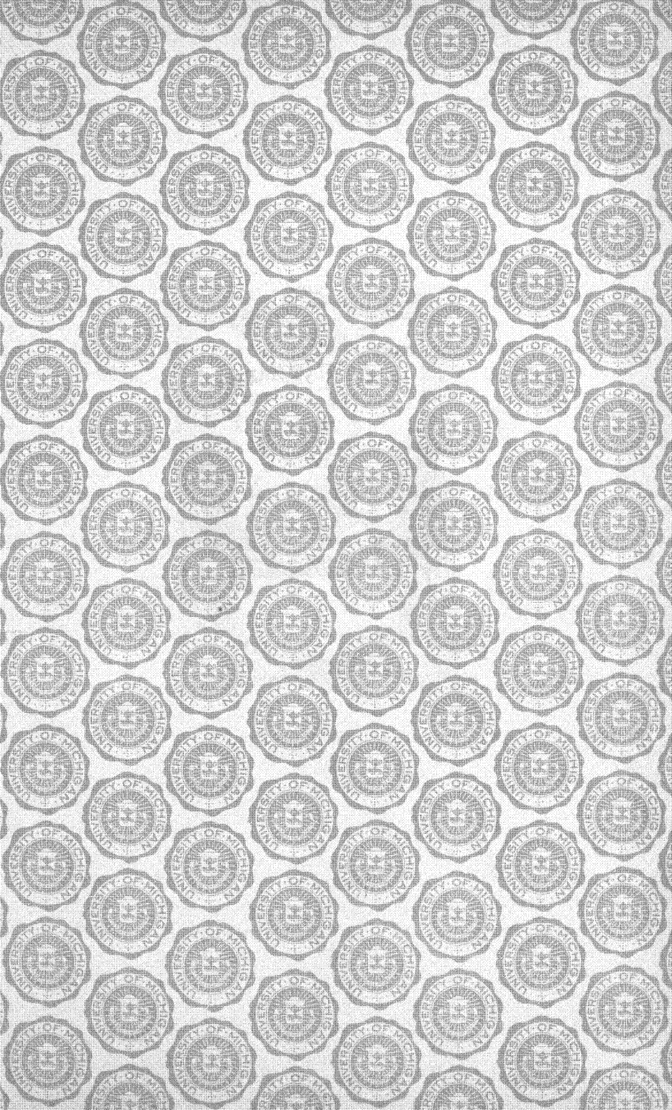

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OCCASIONAL PAPERS

OF THE

Honolulu

BERNICE PAUAHI BISHOP MUSEUM (OF POLYNESIAN ETHNOLOGY AND NATURAL HISTORY.)

VOLUME IV.

HONOLULU, H. I.
BISHOP MUSEUM PRESS.
1906–1911

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OF THE

BERNICE PAUAHI BISHOP MUSEUM OF POLYNESIAN ETHNOLOGY AND NATURAL HISTORY.

VOL. IV.—NO. 3.

Director's Report for 1908.

HONOLULU, H. I.
BISHOP MUSEUM PRESS.
1909

TO THE TRUSTEES OF THE BERNICE PAUAHI BISHOP MUSEUM.

Sirs:—In accordance with the standing vote of the Trustees, I submit my Annual Report on the present condition of this Museum and the general course of work done in the departments during the year 1908.

WILLIAM T. BRIGHAM,
Director of the Museum.

Honolulu, May 1, 1909.
Ordered printed July 9, 1909.

REPORT

THE year 1908 has been memorable for the retirement of the President of the Museum Trustees, Honorable Sanford B. Dole, from the Board, to the sincere regret of every member of the Museum staff and, it may be added with truth, of all who take genuine interest in this Museum, for long before Mr. Bishop decided to found the Memorial which bears the honored name of his wife, Mr. Dole was keen in the belief that such a museum was needed. His correspondence with me at that time was full of interest, and when the foundation was decided upon, Mr. Dole urged the selection of a site in town, preferably the old estate of Paki where Mr. and Mrs. Bishop long made their home a most hospitable centre.

When the charge of the young museum was transferred from the Trustees of the Bernice Pauahi Bishop Trust to a new board consisting of these gentlemen and two especial representatives of the Museum, Mr. Dole, then President of the Republic of Hawaii, was first named for the position by Mr. Bishop, and from that time, as president of the new board, he has shown his great interest in the affairs of the institution and by this interest has greatly encouraged all who were striving for the success of the Bernice Pauahi Bishop Museum in its appointed field.

Mr. Charles Noyes Forbes of the University of California, warmly recommended to me by Professor Setchell, has been appointed Assistant in Botany and he has taken hold of his work with skill and energy since his arrival on June 15th. With the Director he visited the Kilauea region in August and made a valuable collection of the plants found there, and he has since explored the ranges and valleys in the vicinity of Honolulu, extending his trips to a camp on the mountains above Punaluu and the heights of Kaala above Waianae. By his abundant collections we have been able to inaugurate the long promised exchange with the Botanical Garden at Sydney, N. S. W., and the specimens already received in the course of exchange from Australia have been very satisfactory. We hope soon to extend our exchanges to New Zealand and Fiji. In his work on the Hawaiian Flora he has described several new species of considerable interest and his descriptions are appended to this Report. We hope to be able to offer for publication in the Memoirs a decade of little known, poorly described or unfigured Hawaiian plants of interest, of many of which we have secured satisfactory photographs: the series to be continued from time to time as material accumulates.

While the general activities of the Museum have continued to be limited by the absence of any sufficient room for work or storage, those energies not so dependent on the Museum Laboratories have progressed satisfactorily. Mr. J. F. G. Stokes, the Curator of Polynesian Ethnology, has been able to incorporate with the general collection the Deverill collection referred to in the last annual Report as purchased for the Museum, and a summary catalogue of the same is appended to this Report. In his investigations of Hawaiian antiquities he, in common with all who have been compelled to use the valuable work of Fornander on the Polynesian Race, found great annoyance and unnecessary labor from the absence of an index to that work which is filled with information unskilfully arranged and with no key. To make the path easier for future students Mr. Stokes has prepared a most elaborate index extending to eighty-six pages as printed in double columns, and the Trustees have authorized its printing as an extra volume not in our exchange series. The edition is limited to two hundred and fifty copies. Dr. W. D. Alexander, always a friend to this Museum, has written a biographical sketch of Fornander and has warmly commended the volume.

The Curator has also made study of the interesting so-called "shark-pens" near the mouth of Pearl Harbor, which the military authorities of the United States must destroy in the improvement of the harbor, and his results are given with this Report.

Dr. Cooke has continued his laborious collection and examination of the minute forms of Hawaiian Pulmonata, and has also been engaged in cataloguing the important collection of the late M. Ancey, now belonging to this Museum. Mr. J. W. Thompson has added many casts of fishes, fruits and also of stone implements borrowed for this purpose, and these have been excellently colored to correspond with the originals.

A work which enlisted all the forces of the Museum was the removal of all the collections in Hawaiian Hall from the cases to permit the repainting of the iron racks and brackets. These had originally been coated with a bituminous paint which the terebinthine exhalation from the white cedar with which the cases are lined dissolved and made intolerably sticky. This was entirely removed from the many hundreds of brackets and racks, which were repainted with a more suitable material. The removal of specimens and shelves from sixty-two large cases required great care as well as labor, but it is hoped such a removal will not again be needed for a similar cause.

The Director's visit to Kilauea in August and September enabled him to complete his notes on the history of that volcano, on which he has for some time been engaged, and this having been accepted by the Trustees is now passing through the press, and it is hoped will be issued in 1909. The extent of this paper (which will complete volume II of the Memoirs), and the number of the illustrations have delayed the publication, but it is intended to convey to those who have never visited these Islands some adequate idea of the appearance and activities of this most wonderful and accessible volcano: and recall to those who have been fortunate enough to witness its eruptions, the memorable "Pit of Pele" and the outflow of molten rivers from Mauna Loa and Kilauea.

Much work has also been done in the preparation of a volume on Kapa or Bark-cloth, or more properly paper, primarily of these Islands but also including the similar work of other Polynesians and extending through Africa, the East Indies and other countries where this primitive manufacture was once all-important but now everywhere disappearing before the cheaper and more durable product of the loom. With the view of preserving at least the memory of this fast vanishing product of early ingenuity the Trustees of this Museum have made generous provision for illustrating in *fac simile* scores of beautiful or interesting colored specimens from the combined collections of this Museum and of the Director, and these plates are now in the hands of the most competent workmen. It is hoped that the result may be published in the course of 1910.

TABLE OF ATTENDANCE.

1908.	Whites.	Hawaiians.	Portuguese.	Chinese.	Japanese.	Others.	Open on		Visitors on closed days.	Average Attendance.		Total Visitors.
							Public days.	Other days.		Public days.	Other days.	
January	300	140	39	53	239	28	10	3	35	75	12	799
February	478	235	46	249	184	18	9	3	26	132	9	1210
March	401	90	7	135	176	12	8	3	59	95	20	821
April	442	194	22	96	122	11	8	6	119	96	20	887
May	369	139	44	99	135	35	9	3	41	87	14	821
June	311	96	62	66	136	30	9	5	63	71	13	701
July	568	98	65	97	195	16	12	5	40	83	8	1039
August	324	74	43	81	172	31	9	7	55	74	8	725
September	408	104	30	108	164	24	9	2	7	92	4	838
October	385	108	40	87	177	14	10	6	80	73	13	811
November	241	104	37	87	104	14	8	4	24	70	6	587
December	245	82	17	50	63	10	7	4	12	65	3	467
Totals	4472	1464	452	1208	1867	243	108	51	561	84.6	11.	9706

List of Accessions.

DEPARTMENT OF ETHNOLOGY.

Collection of the late W. E. H. Deverill of Kauai, purchased and presented by the Charles R. Bishop Trust. Specimens collected in Hawaiian Islands except where otherwise mentioned.

9192–9216	Umeke.
9217–9220	Pa.
9221	Pa ia.
9222	Ipu kuha.
9223–9244	Squid sinkers.
9245–9247	Squid hooks.
9248–9250	Stone mirrors.
9251–9252	Polishing stones.
9253–9256	Olona scrapers, of pearl shell.
9257–9259	Kapuahi kuni anaana.
9260	Noa stone.
9261	Kikeula.
9262	Stone end of club.
9263–9265	Adz handles.
9266	Laau melomelo.
9267	Lei palaoa.
9268	38 Bambu kapa markers.
9269	Stone fish god.
9270	Piikoi.
9271–9274	Music sticks.
9275	6 Net menders.
9276–9279	Netting needles.
9280–9281	Spacers.
9282	Tobacco pipe.
9283	Supply of shark's teeth.
9284–9285	Huewai pawehe.

9286	Hinai poepoe.
9287–9289	Hula drums.
9290	½ Ipu uhane.
9291–9295	Koko puupuu.
9296–9308	Kapa moe, malo, kihei, etc.
9309	Uluna.
9310–9313	Awa cups.
9314–9333	Adzes.
9334–9335	Hammers.
9336–9337	Flat stone dishes.
9338	Sculptured stone lamp.
9339–9343	Stone lamps.
9344	Poho kui palu.
9345–9350	Poi pounders, common form.
9351–9354	" ring form.
9355–9357	" stirrup form.
9358–9360	Pestles.
9361–9372	Ulumaika, disk form.
9373	" spherical form.
9374–9408	Kapa mallets.
9409	Kapa anvil.
9410	" for malo.
9411–9413	Olona boards.
9414–9417	Spears.
9418–9419	Wood carving tools.
9420–9421	Niho palaoa.
9422	Ivory bead necklace.
9423–9426	Ivory bead bracelets.
9427	Ivory bead.
9428	Tobacco pipe.
9429	Ipu hokiokio.
9430–9435	Fish hooks of pearl, for trolling.
9436	" tortoise shell.
9437	" ivory.
9438	" coconut shell.
9439–9443	" pearl shell.
9444–9449	" tortoise shell.
9450–9451	" pearl and tortoise shell.
9452–9456	" human bone.

9457–9458	Files.
9466–9467	Pa puaa.
9468	Laau lomilomi, of Kaumualii.
9469	Kapa mallet.
9470	Spear, broken.
9471–9473	Awa cups.
9474	Gourd cup.
9475	Auamo.
9476–9479	Net menders.
9480	Iron fish hook.
9481	Olona.
9482	Ulili.
9483	White kapa.
9484–9489	Shells.
9490–9493	Koko.
9494–9496	Poi pounders, ring and stirrup forms.
9497–9506	Squid sinkers.
9507	Stone hammer.
9508	Stone head of club.
9509–9512	Adzes.
9513–9514	Pestles.
9515	Mortar.
9516	Crab shell.
9517	Turtle skull.
9518	Piece of drift wood (? idol).
9459	Ivory charm. Alaska.
9460	Wooden fish hook. Ellice Islands(?).
9461	Stone dish. Nihoa.
9462	Implement of coral rock; possibly for scaling fish. Nihoa.
9463	Implement of coral rock. Nihoa.
9464	Tapa. Samoa.
9465	Spear. Society Islands.

Gifts.

9653	Stick made from coffee wood. Given by Mr. A. F. Judd.
9654	Dancing wand. Given by the Hawaiian Board of Missions.
9655	Dancing mask. New Hebrides. Given by Mr. L. A. Thurston.

9656–9657	Kapa. Hawaiian Ids. Given by Mrs. W. R. Castle.
9658–9659	Kapa mallet. Hawaiian Ids. Id.
9660	Koko puupuu. Hawaiian Ids. Id.
9661	Roll of human hair braid. Hawaiian Ids. Id.
9662	Squid hook. Hawaiian Ids. Id.
9663	Pala i e (cup and ball). Hawaiian Ids. Id.
9664	Tail feathers of Phaëthon rubricauda. Id.
9665–9666	Stone implements. Hawaiian Ids. Id.
9667	Fillet. Micronesia. Id.
9668	Stone for trapping birds. Hawaiian Ids. Given by Mr. E. S. Cunha.
9669	Stone idol. Hawaii. Given by Mr. Jared G. Smith.
9077–9080	Bundles of bones. Hawaiian Ids.
9081	Mummified baby. Hawaiian Ids.
9530	Umeke. *Purchased.*

DEPARTMENT OF CONCHOLOGY.

Number of shells collected and sent to the Museum for identification	26,392
Number of shells purchased (Ancey collection)	14,018
Total	40,410

The number of new catalogue numbers added was 2810.

Shells have been received from Messrs. I. Spalding, E. Davis, C. S. Dole, C. A. Rice, A. F. Judd, A. F. Knudsen, F. R. Greenwell, H. Podmore, D. D. Baldwin, P. Deverill, D. Thaanum, J. F. G. Stokes, G. Fuller, L. Wishard, O. H. Swezey and C. N. Forbes.

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Cambridge, Mass.—Harvard University Library.
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  Peabody Museum.
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Chicago, Ill.—Field Museum.
Christchurch, N. Z.—Canterbury Museum.
Cologne, Germany.—Rautenstrauch-Joest Museum.
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Dublin, Ireland.—Royal Irish Academy

Edinburgh, Scotland.—Royal Society of Edinburgh.
Florence, Italy.—Società Italiana di Antropologia e Etnologia.
Geelong, Vic.—Gordon Technical College.
Genoa, Italy.—Museo Civico di Storia Naturale di Genoa.
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Hanover, N. H.—Dartmouth College.
Hilo, Hawaii.—Hilo Public Library.
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  Oahu College.
  United States Experiment Station.
Lawrence, Kansas.—University of Kansas.
Leiden, Holland.—Rijks Ethnographisches Museum.
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Leipzig, Germany.—Städtisches Museum für Völkerkunde zu Leipzig.
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Natal, S. Africa.—Natal Government Museum.
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Oberlin, O.—Oberlin College.
Para, Brazil.—Museu Goeldi.
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American Philosophical Society.
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San Francisco, Cal.—California Academy of Sciences.
Sâo Paulo, Brazil.—Museu Páulista.
St. Louis, Mo.—Missouri Botanical Garden.
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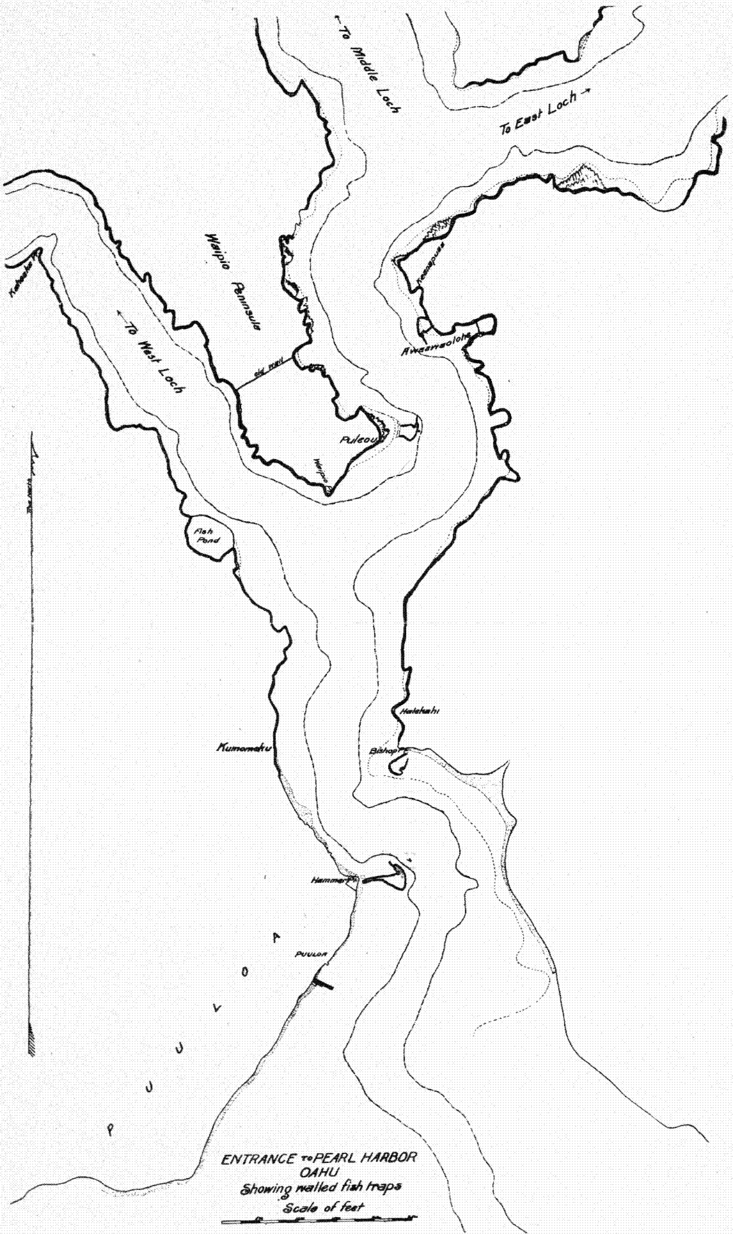

MAP OF THE ENTRANCE TO PEARL HARBOR, SHOWING POSITION OF FISH TRAPS.

Walled Fish Traps of Pearl Harbor.

BY JOHN F. G. STOKES.

AMONG the few remaining evidences of early Hawaiian life are the walled fish traps, pounds or weirs at the entrance to Pearl Harbor, Oahu. They are particularly interesting as not occurring elsewhere in the group, probably for the reason that conditions favorable to their operation are only to be found at this one place.

The Hawaiians have had for many years a system of raising fish for food within ponds and walled enclosures, called *loko*, adjacent to the sea, the varieties being confined to such shore fishes as *amaama* (*Mugil cephalus* Linnæus), and *awa* (*Chanos chanos* Forskål), and an occasional *moi* (*Polydactylus sexfilis* Cuv. & Val.), *kaku* (*Sphyræna snodgrassi* Jenkins), or *oopuhue* (*Tetraodon* sp.) which may have entered the pond when young. The system is still in use in all the islands, more particularly on Molokai[1] and Oahu, and has already been referred to by Dr. J. N. Cobb.[2] There was also a method of taking fish in weirs in the mountain torrents, in which the stream was dammed with a transverse wall just above the rapids and conducted by means of a canal over a horizontal sieve of long slender sticks lying parallel and close together. During floods, when the waters of the stream were rendered muddy, great quantities of *oopu* (fresh water gobies) were caught in these weirs.

The Pearl Harbor fish traps on the other hand were used for the purpose of taking the ocean fishes which had entered the harbor, the principal being the *akule* (*Trachurops crumenophthalma* Bloch), *oio* (*Albula vulpes* Linnæus), *weke* (*Mulloides* and *Pseudupeneus* sp.), and *pualu* (*Hepatus guntheri* Jenkins), and the *makiawa* (*Etrumeus micropus* Schlegel). Occasionally other fishes were taken in small numbers such as *kawakawa* and *aku* (*Gymnosarda* sp.), *opelu* (*Decapterus pinnulatus* Eyd. & Soul.), sharks—in fact

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[1] On this island, use was made of very large ponds, in the walls of which were numerous entrances and exits—the fish being netted while attempting to pass through. It is hoped to illustrate these structures at a later date.

[2] U. S. Fish Commission Bulletin, vol. xxiii, pt. 2, p. 746.

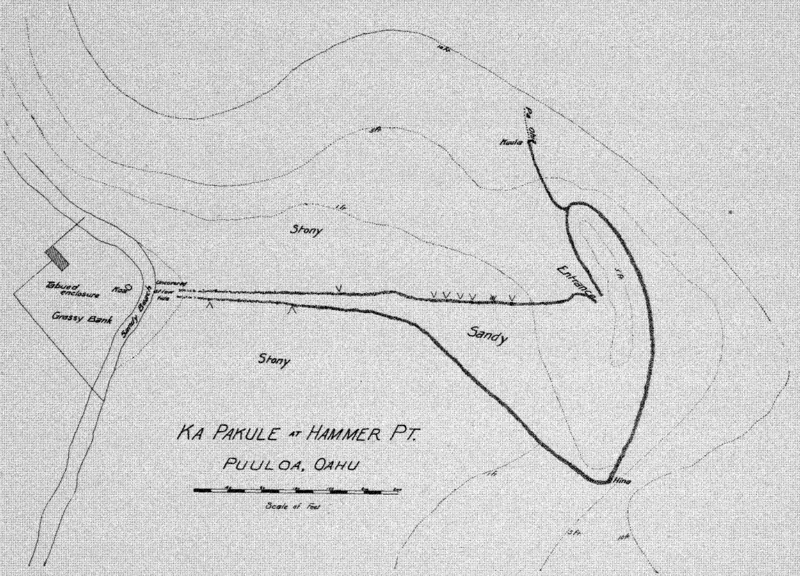

FIG. 1. PLAN OF PAKULE AT HAMMER POINT.

one trap known as *Pakule* is claimed by older Hawaiians to have been entered by every fish except the whale(!) and to have retained every kind except the amaama, which latter could find its way out over the walls.

Three traps now remain, the largest called "Pakule" (originally without doubt *Pa akule*, the akule pen, since the akule was the most important fish taken therein) on the west bank of the channel at Hammer Point. In this trap (Fig. 1) were caught all the fishes just mentioned except the makiawa. In modern times sharks have been captured within its confines, and it now goes by the name of "The Shark Pen" among the white residents. The other two traps (Figs. 2 and 3) are called "Pa makiawa" and are situated, one on the west of the channel at the point called Puleou and now sometimes misnamed Pookala (which was formerly the name for Waipio Point), and the other on the east of the channel between the place called Keanapuaa and Awaawaolohe bay. In these the makiawa was taken. Formerly there was another trap on the east bank of the channel at Bishop Point, which has been in ruins as far back as any modern native can remember; it has been removed and the stones used to build a small pier near the point. From descriptions it has been gathered that the shape, position and use were the same as the pa makiawa at Keanapuaa.

The general shape of the three fish traps is alike. A heavy curved wall following generally the direction of the shore was built in the deeper water, and, turning back for about one-third of the distance, formed a pocket and acted as one side of the entrance. From the turn another wall ran out to deep water as a leader. From the shore side of the entrance a wall was constructed, first parallel with and then directly to the shore, diminishing in size as the water shoaled. The rear end of the outer wall and the beach were joined by another wall. The walls varied in width from a single line of stones near the shore to from three to six feet in the deepest part, and were built of blocks of coral reef rock averaging in size eighteen by fifteen by six inches.

On the walls of the Pakule running shorewards were many pieces of dark basalt and of a curious black indurated mud resembling adobe. At several places along the bank of the channel a stratum of the latter substance crops out between two strata of reef rock, and at Keanapuaa this sedimentary deposit is two feet deep. The basaltic pieces, however, must have been brought from a distance of several miles. Tradition has it that all the stones for the walls were brought from a hill in Ewa, Oahu, called "Puuopalalii" which is of volcanic origin; the earliest account must have related to these few lava rocks. The dark stones were more numerous along the north wall than on the south, and those found in position were about thirteen feet apart. The natives called them "men" who drove back the fish attempting to pass over the wall. When newly laid, the dark stones would have contrasted very strongly with the light color of the coral rock, and undoubtedly fulfilled their purpose then, but when seen, they were so thickly covered with mollusca and barnacles as to be well nigh indistinguishable from the rest. It has been claimed that the dark stones had been worked by hand to resemble sharks' heads, but an examination showed them to have been the result of natural cleavages, and their shape undoubtedly influenced the builders in their selection. The best shaped specimen of each kind of stone

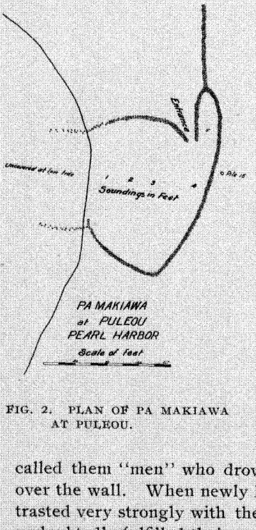

FIG. 2. PLAN OF PA MAKIAWA AT PULEOU.

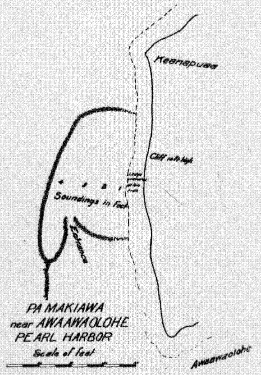

FIG. 3. PLAN OF PA MAKIAWA NEAR KEANAPUAA.

is shown in Figs. 4 and 5: A is a piece of indurated mud; C, a layer of the marine growth above mentioned, one and one-eighth inches thick which has fallen from A since its removal from the water, while B is a piece of basalt nineteen inches high. The dark stones are indicated by arrow points in Fig. 1.

At the north end of the leader wall is another dark stone about four and one-half feet long and one foot wide and thick. It was lying on the bottom of the water when seen, but formerly stood erect. Its name was "Kuula," the Hawaiian fish god. Kuula was a noted fisherman in early days, who has since been deified and is still worshipped on all the coasts of these islands in the shape of stones, sculptured and rough, and in small walled enclosures. His wife Hina is sometimes with him, and in the Pakule she is to be found as a roughly pentagonal slab of coral rock about two and one-half by two feet by eight inches in size,

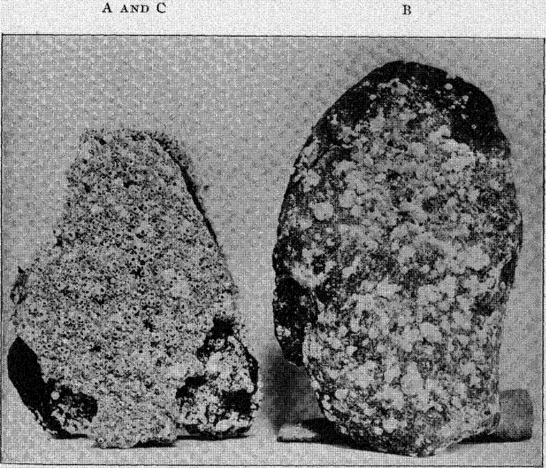

FIG. 4. DARK STONES ON WALLS OF PAKULE.

and her position is on the south end of the outer wall standing erect and facing the open sea.

Running out into deeper water from Kuula and in the same direction as the leader, there formerly stood a row of twelve *ohia* tree stems about six fathoms high and three feet apart. It was called "Pa Ohia," and some of the trees were seen in place ten years ago. It is probable that the other fish traps were similarly provided.

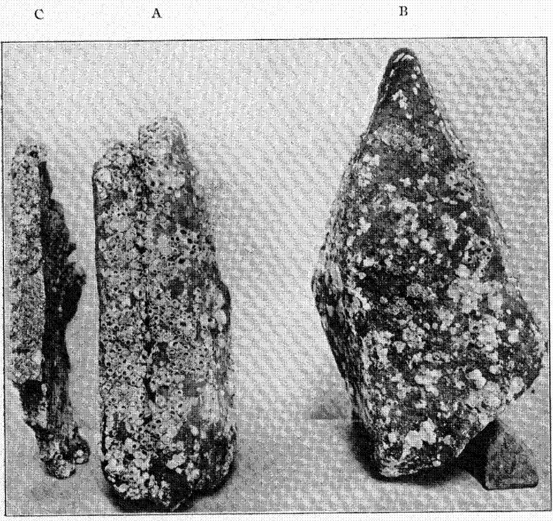

FIG. 5. DARK STONES ON WALLS OF PAKULE.

The walls of the Pakule are approximately nine inches above water at low tide, and the height of the tide averages one and one-half feet. The walls of the two pa makiawa are just covered at low tide, but were probably a little higher, as they are not so well preserved as those of the Pakule. The two former pens, judging from the marine growth, are much older than the latter. On the walls of the pa makiawa at Puleou, no dark stones were observed, but a few were seen on the *outer* wall of that at Keanapuaa, and none on the side walls.

From rough soundings made, it was observed that the corresponding depth of water inside and outside of the fish traps did not appreciably differ. In the plans, the depth at low tide is marked in feet. Some months ago when sections of the north and south walls of the Pakule were removed (as seen in Figs. 7–10) it was found that the stones were lying on top of the sand bank and that conditions were the same as at the time of building. The writer is waiting to watch the removal of the heavier outer wall.

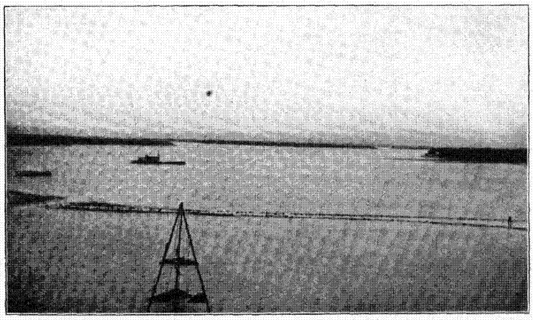

FIG. 6. THE PAKULE, WESTERN HALF.

It is interesting to note what advantage of natural conditions was taken by the early fishermen in constructing their traps on the banks jutting out into the channel. In referring to the map, it should be remembered that the pa makiawa at Bishop Point was merely drawn in from description. The natives say that the incoming tide flows more strongly against the east side of the channel, while the west side bears the heavier proportion of the ebb. To reap the full benefit of this condition, the entrances of the pens were built opposed to the stronger current.

date as about thirteen generations ago, when the building of the walled fish ponds must have been sufficiently novel to the native chronicler for the fact to be recorded. Then it was that Kalaimanuia,[4] queen of Oahu, was accredited with the building of three fish ponds in Pearl Harbor, *Kapaakea* in Waimalu, and *Opu* and *Paaiau* in Kalauao, and her son Kaihikapu is mentioned as constructing two more in Moanalua near by. As to whether the fish ponds or the fish traps took precedence in time in these islands is an open question. Under ordinary circumstances it might easily be conceived how fishermen observing the assistance given by a natural wall or bank in the water and channels in the reefs, when surrounding their prey, would construct artificial walls to assist in driving the fish, and the walled fish trap as here illustrated might follow as a natural development. Ethnology teaches us that the rearing of animals denotes a higher civilization than the hunting of the same, and it is reasonable to admit that the growing of fish in the ponds and their conservation for future needs is an advance on the method of capturing supplies to fill immediate demands.

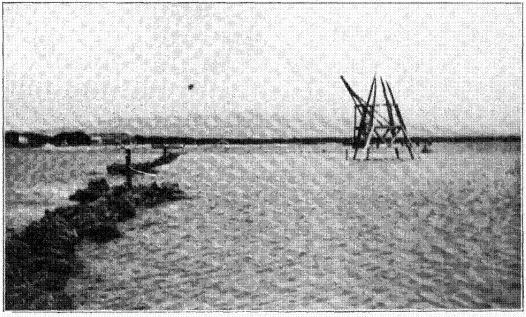

FIG. 8. SOUTH WALL OF PAKULE, LOOKING WEST.

The original fish pond was probably a fish trap in which a larger supply than needed was taken at one time and the fish retained therein until used. This advantage of a supply on hand might well have suggested the enlargement and alteration of the shape of fish traps for use as fish ponds, the present simple walled structure constituting the latter, being the natural result of economy of labor. However, this explanation drawn from local conditions can hardly be taken as a guide to priority of age of the fish traps now remaining at Pearl Harbor in comparison with the fish ponds of these islands, as both are well developed forms fully adapted for their respective uses, and existed in full operation at the same time side by side. It is not improbable that they owe their origin to a time prior to the advent of the Polynesians to these islands, and it would be interesting to observe what advances in these directions the southern Polynesians had made. The similarity of type of the fish traps at Pearl Harbor seems to indicate a familarity with some previously known form, though they may also have been copied from one original in Pearl Harbor, in which case that on Bishop Point was probably the first, followed in order of time by those at Puleou, Keanapuaa and Hammer Point, judging from the marine growth and condition of the walls.

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[4] Polynesian Race, vol. ii, p. 269.

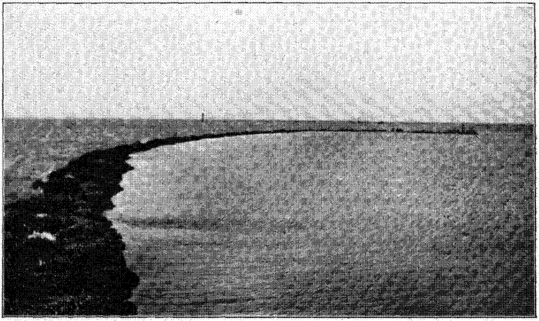


FIG. 9. OUTER WALL OF PAKULE, LOOKING SOUTH.

It is among the fisherfolk that we find superstitions most prevalent today, and many Hawaiian fishermen are still as punctilious in the offerings of "first-fruits" as they were formerly. When a Hawaiian makes a new net, the first object drawn up, be it fish, seaweed or pebble, is offered to Kuula with a prayer to insure the luck of the net. Formerly, and in isolated cases today, the first fish of the catch was brought ashore and dedicated to Kuula, the ceremony as now observed being a simple offering generally accompanied by a prayer and varying according to the locality and the individual.

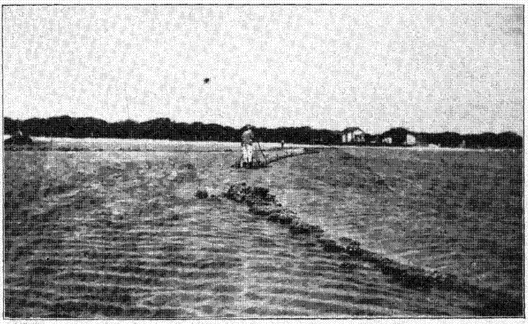


FIG. 10. NORTH WALL OF PAKULE, LOOKING WEST.

At Hammer Point above the beach and in line with the north and south walls of the Pakule is an *imu* or underground oven called "Koa" (Figs. 1 and 11). Koa is the name of a small walled enclosure or platform, numerous examples of which are scattered around the coasts of these islands, where the fish are offered to Kuula. This Museum is fortunate in having in its employ as a janitor a Hawaiian fisherman who lived for many years near Puuloa, and through him most of the native information was gleaned. The Pakule and the land at Hammer Point enclosed by the fence and the house (see Fig. 1) were tabu to Kuula and watched over by his *kahuna* or priest, who lived in the house and drew the fish into the trap by means of invocations to his deity. It would seem that the ceremonies connected with this Pakule were to be stringently observed, as, if a kahuna in his incantations even misplaced a word, the ceremony would be of no effect and the kahuna would die. The priest was believed to have the power to draw into the trap at will any variety of fish desired, and for his services he received payment in advance from the fishermen who expected to benefit from the catch. It was believed that when invoked, Hina enticed the variety of fish desired into the harbor from the sea. On the return of the fish to the ocean, they perceived Kuula hiding behind the wall and fearing to pass him, attempted to make their way over the bank, where they were stopped by the men on the walls (represented by the black stones). Threatened on both sides, they entered the trap. Mr. Bruce Cartwright Jr. found on top of the wall near Hina a collection of four or five small pieces of basalt; the largest, under seven inches long, was preserved and shown to a native, who said it represented a certain fish. It may be that the kahuna, who believed in his power as thoroughly as did his customers, desig-

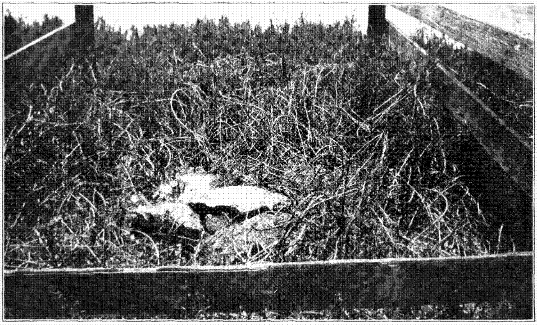


FIG. 11. KOA.

nated to the goddess the variety of fish he prayed for, by means of such stones placed where described.

Piopio is said to have been the kahuna until 1882 or 1883, followed by Kaanaana until 1889. Then Kimona took charge and operated the Pakule until 1891 when he left to live at Moanalua. Several attempts to resuscitate the fishing have since failed, in 1907 no less than three kahunas being called in at different times, and the natives have observed that these three priests have died since their failure, and the man employing them has lost his position!

The janitor was once a participant in a catch of fish, when several fishermen asked the kahuna to call in a certain variety. They were told to return the following morning. On their return, the fish were waiting and while the kahuna uttered his prayers by the heating imu, the fishermen surrounded the shoal; leaving the catch in the water inside the net, they brought one fish—the first—to the kahuna who offered it to Kuula and cooked it in the oven, all the while mumbling his prayers, which the janitor, who was desirous of learning how to do it, could neither hear clearly nor understand. When cooked the fish was partaken of by every one present, and all the remains buried in the oven. Mr. Cartwright has lately informed the writer that there are certain holes in the ledge of rock at Puleou in which, it was said, the fish were cooked, and it is more than probable that similar customs prevailed at the other fish traps, the cessation of the same being due to the overshadowing influence of the larger and better situated Pakule, which is also, as before remarked, probably the most recent.

The walls of the Pakule and the fenced ground have been refered to as tabu to Kuula. Males and unmarried girls were permitted to pass along the walls and through the enclosure, but if any married woman were to trespass in these sacred precincts, a sickness would attend her which would end her life unless cured by Kuula's kahuna. Another version is that both the woman and the kahuna would die. It might be mentioned that from the walls of fish ponds women were debarred during the period of their menses, the belief being that the fish in the pond would become poor and thin, and the consequences to the woman, a serious illness or even death. Any explanation of this and the foregoing beliefs the writer has been unable to obtain.

The janitor had observed that during the incumbency of the various kahuna sharks were never known to have entered the trap, but since the Pakule has been unguarded these fish have often trespassed. An evidence of this is the curious fact that today the Pakule is known to the white population as "The Shark Pen," and the belief is general among others than the aborigines that it was built for the purpose of entrapping sharks.

These walled fish traps, being in the line of the channel planned by the United States naval authorities, will probably cease to exist within the next twelve months.

Some New Hawaiian Plants.

By CHARLES N. FORBES.

April, 1909.

The English system of measurement is retained in the English descriptions to facilitate comparison with descriptions of the Hawaiian plants. The line is one-twelfth of an inch.

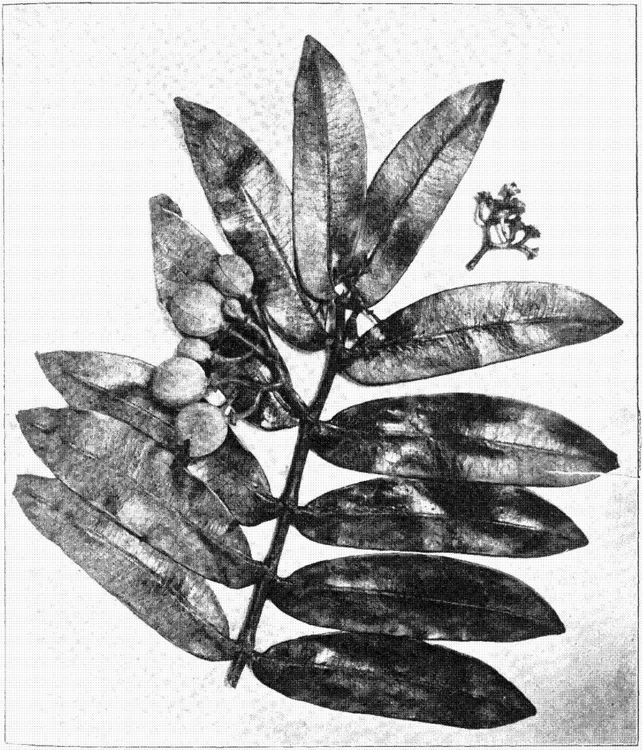
Euphorbia Rockii, sp. nov.

Arbor 1–3.5 m. alta, foliis oppositis, obovato-oblongis, inequalibus, obtusatis, basi rotundatis, 8–12×2.5–3 cm. brevissime petiolatis vel sessilibus; cymis axillaribus 3-4 cm. longis, pedicellis 5 mm. longis; involucri campanulati, lobis minimis, lanceolatis, acutis, glandulis transverse oblongis; capsulæ hexagono-obovatis, glabris, 2×2.2 cm.

Type locality, Punaluu Mountains, Oahu, H. I. Forbes & Rock, Sept. 14-21, 1908.

An erect shrub or small tree four to twelve feet high. Leaves opposite, obovate-oblong, obtuse, uneven-sided with a clasping base, nearly sessile, 3–4.5 × 1–1.25 inches. Flowers in open axillary cymes, 15–18 lines long. Involucre campanulate, minutely hairy or glabrous on the outside, pubescent on the inside, lobes ovate, minute, glands transversely oblong not appendiculate. Style branches short, nearly free. Capsules large 9×12 lines, on nodding peduncles.

This tree was discovered by Mr. J. F. Rock some two months before the gathering of the type material. The tree is distinguished by its large pink fruits, nearly sessile leaves and by its open cymes.



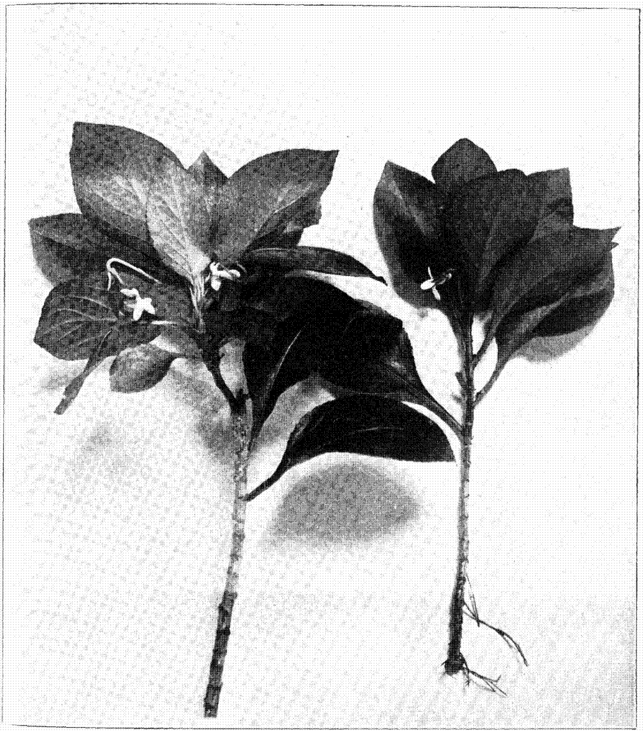
EUPHORBIA ROCKII FORBES.

Viola oahuensis, sp. nov.

Caule erecto 15–45 cm., foliis ovatis, serratis, acutis, basi acuminatis, 12–13 × 5–5.5 cm., petiolis pennatis 2.5 cm.; stipulis lanceolatis, acuminatis, glandular-serratis, 1.5–3 cm.; scapis umbellato biflores. Sepala lanceolata 8 mm. Petala oblonga vel orbicula, 16 mm. inferiore saccato. Capsula 1 cm. longa.

Type locality, Punaluu Mountains, Oahu. Forbes & Rock, Punaluu Mountains, Sept. 14-21, 1908.

Stem erect, simple or sparingly branched, 6 inches to 1 foot high. Leaves 4.5–5 × 2–2.25 inches, ovate, uneven-sided, glandular-serrate, acute, base acuminate drawn out into a winged petiole of 1 inch. Stipules lanceolate, glandular-serrate, acuminate, 7–14 lines. Scapes or peduncles one to three on a stem, 9 lines long, with two narrow acute bracts and a reduced leaf, bearing two flowers on peduncles of nearly equal length, about 2 inches, these bracteolate and often with a reduced leaf. Sepals lanceolate, faintly puberulent, 3 lines long. Petals about twice as long, white, broad, oblong to orbicular, the lower saccate, not bearded. Capsule a little over 5 lines long, glabrous.



VIOLA OAHUENSIS FORBES.

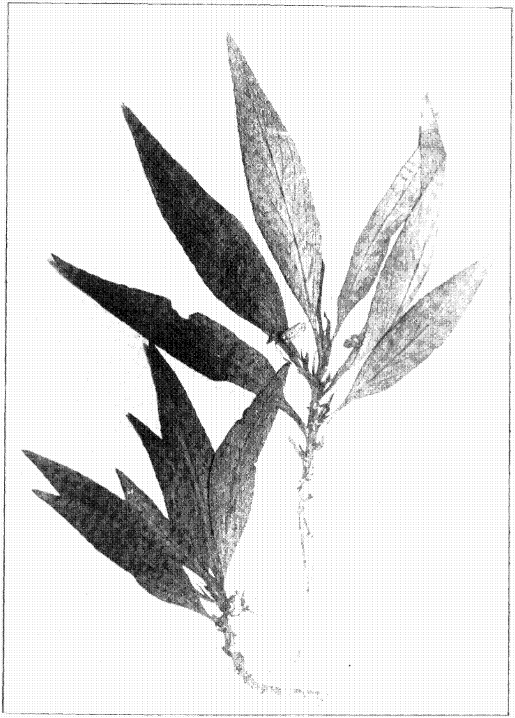
Viola Helena, sp. nov.

Caule erecto 3-6 cm., foliis lanceolatis 7.5-11.5 × 1.5-2 cm. dentibus glanduliferis stipulis lineari-lanceolatis, serratis, 8 mm.; scapis bibracteatis umbellato biflores. Sepala lanceolata 4-5 mm. Petala alba, inferiore latissime saccato. Capsula 1 cm. longa, glabra.

Type locality, Wahiawa Mountains, Kauai, H. I. J. M. Lydgate, May, 1908.

Plant one to two feet high.—Lydgate. Leaves lanceolate, tapering at both ends, glandular serrate, 3-4.5 inches long by 7-9 lines wide, with petioles of 2-3 lines. Scapes or peduncles one or two on a stem, 2-3 lines, with two to three linear bracts, bearing an umbel of two flowers on pedicels of 10-14 lines which have bractlets of about 1 line. Sepals lanceolate, 2 lines. Petals a little more than twice as long, the lower saccate, white, or pale lavender, lower and lateral ones bearded. Capsule glabrous, 7 lines long.

The species is named by Mr. Lydgate for his wife.



VIOLA HELENA FORBES & LYDGATE.

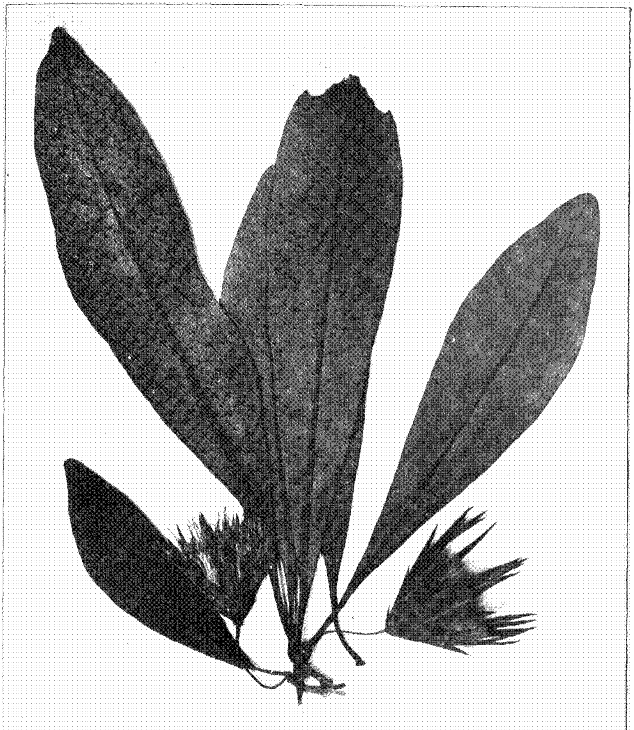
Hesperomannia Lydgatei, sp. nov.

Arbor 2–3 m. alta; foliis spathulo-ovatis, acutis, basi acuminatis, glabris, 10–22.5 × 2.5–5.4 cm., petiolis .8–2.5 cm. Capitulum 4–8.5 cm., pedunculibus attenuatis 3.5–4 cm. Involucrum campanulato-turbinatum, interioribus lineari lanceolatis 4–4.5 cm., exterioribus ovato-lanceolatis, brevioribus. Corollæ 2–2.5 cm. Stylus 6–7 cm.

Type locality, Wahiawa Mountains, Kauai. J. M. Lydgate, May, 1908.

Six to nine feet, lobelia habit of growth.—Lydgate. Leaves 4–9×1–1.5 inches with petioles of 6–12 lines, spathulo-ovate to oblong, acute, acuminate at the base, entire, glabrous. Heads 2–3 inches high, four or five in a terminal cluster, on slender peduncles of 1.5 inches. Involucre about 2 inches high, bracts in four to eight rows; outer bracts ovate-lanceolate, inner bracts much longer, linear-lanceolate. Corolla 12 lines, split to near the middle. Anthers 3 lines. Achenes (not mature), pappus pinkish, a little over 9 lines long.

This species is easily distinguished from the other species of Hesperomannia by the long slender peduncles, and by the shape of the leaves which are not dentate.



HESPEROMANNIA LYDGATEI FORBES.

Lysimachia longisepala, sp. nov.

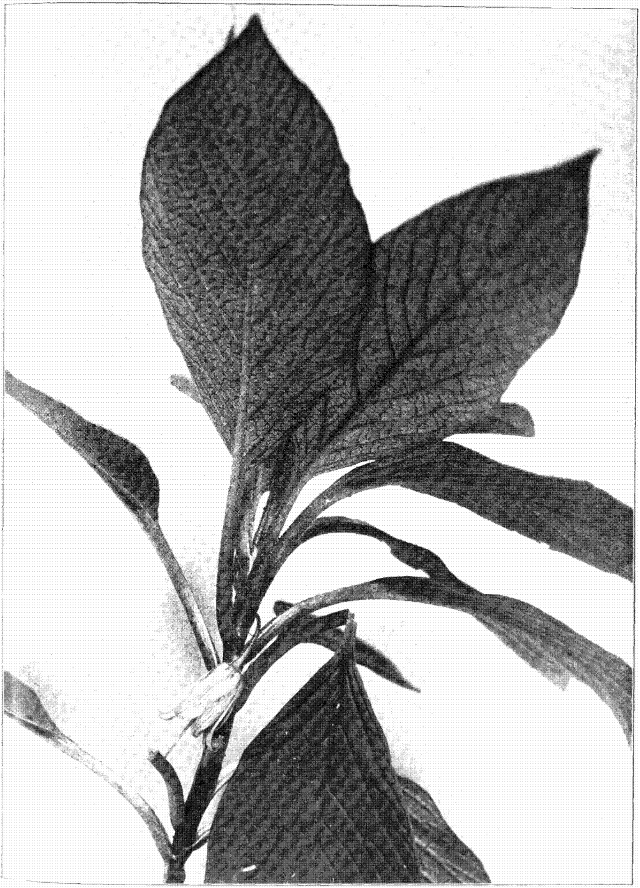
Folia ovata, acuminata, 11.5–15 × 5–6.5 cm., basi acuminata; petiolus tomentosus, 2–3 cm. longus. Flores 2–3, auxillaries; pedunculi tomentosi, 2–3 cm. longi; calyx lobis 6–8, lanceolatis, 2.5 cm. longis; corolla ovato-lanceolata, 1 cm. longa, filamenta basi dilata, subconnata. Capsula crustacea, 16 × 10 mm.

A suffruticose plant six inches to three feet in height, usually unbranched, the new growth being tomentose with purplish hairs, becoming glabrous with age. Leaves very dark green above, paler beneath, ovate, acuminate, 4.5–7.5×2–3.5 inches, the base narrowing into a tomentose petiole of 22 lines. Flowers pendulous, one to three in the axils of the upper leaves, on tomentose peduncles 9–14 lines long. Calyx green, marked with deep purple veins, and tomentose on the back with purple hairs, its deeply parted seven (6–8) lanceolate lobes longer than the corolla, 11 lines. Corolla colored as the calyx, its lobes ovate lanceolate, minutely serrate, 5 lines long. Stamens less than one half the length of the corolla, filaments dilated at the base, sub-connate. Style about the length of the corolla. Capsule bottle-shaped, thick, crustaceous, 8 lines long, 5 lines in diameter, tipped by the style of 8 lines in length.

Flowering specimens were first collected when in the company of Mr. J. F. Rock during September, 1908, and eight months later fruiting specimens were collected in the company of Dr. C. M. Cooke and Mr. C. L. Thompson. The plant occurs in wet woods of the Punaluu Mountains, Oahu. Elevation about 2,300 feet.

The difference between this species and the other Hawaiian *Lysimachias* seems almost generic. It is unique among our species for having a longer calyx than corolla, and otherwise differs in its more cylindrical flowers which are twisted tighter in the bud, and in its much larger leaves.

May, 1909. [222]



LYSIMACHIA LONGISEPALA FORBES. FRUITING STAGE.

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